What is claimed is:

1. A method of manufacturing an electromechanical device having a mechanical structure including a fixed electrode, wherein the electromechanical device includes a substrate, an insulation layer disposed on the substrate, and a first semiconductor layer disposed on the insulation layer, the method comprising:

removing a first portion of the first semiconductor layer;

removing a first portion of the insulation layer to thereby expose a portion of the substrate and form an anchor opening;

depositing an anchor material in the anchor opening;

depositing a second semiconductor layer over the anchor material;

forming the fixed electrode from at least the second semiconductor layer that is disposed over the anchor material, wherein the fixed electrode is affixed to the substrate via the anchor material.

2. The method of claim 1 wherein the anchor material includes silicon nitride, silicon carbide, germanium, silicon/germanium or gallium arsenide.

3. The method of claim 1 wherein the mechanical structure further includes a moveable electrode, juxtaposed the fixed electrode, and wherein the method further includes forming the moveable electrode including:

defining the moveable electrode by removing first and second portions of the second semiconductor layer;

releasing the moveable electrode by removing the insulation layer underlying the moveable electrode wherein the anchor material is not substantially removed when releasing moveable electrode.

4. The method of claim 3 wherein the insulation layer is comprised of silicon oxide and the anchor material includes silicon, silicon nitride, silicon carbide, germanium, silicon/germanium or gallium arsenide.

5. The method of claim 3 wherein the insulation layer is comprised of silicon oxide and the anchor material includes silicon, silicon carbide, germanium, silicon/germanium, or gallium arsenide.

6. The method of claim 3 wherein the insulation layer is comprised of silicon nitride and the anchor material includes silicon, silicon oxide, silicon carbide, germanium, silicon/germanium or gallium arsenide.

7. The method of claim 1 further including depositing the second semiconductor layer on a portion of the first semiconductor layer and wherein the fixed electrode further includes the portion of the first semiconductor layer.

8. The method of claim 7 wherein a substantial portion of the fixed electrode overlying the anchor material is a monocrystalline silicon.

9. The method of claim 7 wherein a substantial portion of the fixed electrode overlying the anchor material is a polycrystalline silicon.

10. A method of manufacturing an electromechanical device having a mechanical structure including fixed and moveable electrodes that reside in a chamber, wherein the electromechanical device includes a substrate, an insulation layer disposed on the substrate, and a first semiconductor layer disposed on the insulation layer and wherein the fixed electrode is affixed to the substrate via an anchor material, the method comprising:

removing portions of the first semiconductor layer and the insulation layer to thereby expose a portion of the substrate and form an anchor opening;

depositing an anchor material in the anchor opening;

depositing a second semiconductor layer over the anchor material and the first semiconductor layer;

etching the first and second semiconductor layer to form the fixed and moveable electrodes from the first and second semiconductor layers wherein the fixed electrode includes at least a portion of the second semiconductor layer that is disposed over the anchor material, and wherein the fixed electrode is affixed to the substrate via the anchor material;

depositing a sacrificial layer over the fixed and moveable electrodes;

depositing a first encapsulation layer over the sacrificial layer;

forming at least one vent in the first encapsulation layer;

releasing the moveable electrode by removing the insulation layer underlying the moveable electrode wherein the anchor material is not substantially removed when releasing moveable electrode; and

depositing a second encapsulation layer over or in the vent to seal the vents wherein the second encapsulation layer is a semiconductor material.

11. The method of claim 10 wherein the first encapsulation layer is comprised of polycrystalline silicon, amorphous silicon, silicon carbide, silicon/germanium, germanium, or gallium arsenide.

12. The method of claim 11 wherein the second encapsulation layer is comprised of polycrystalline silicon, porous polycrystalline silicon, amorphous silicon, silicon carbide, silicon/germanium, germanium or gallium arsenide.

13. The method of claim 10 wherein the insulation layer is comprised of silicon oxide and the anchor material includes silicon nitride, silicon carbide, germanium, silicon/germanium or gallium arsenide.

14. The method of claim 10 wherein the insulation and sacrificial layers are comprised of silicon oxide and the anchor material includes silicon, silicon carbide, germanium, silicon/germanium or gallium arsenide.

15. The method of claim 10 wherein the insulation layer is comprised of silicon nitride and the anchor material includes silicon, silicon oxide, silicon carbide, germanium, silicon/germanium or gallium arsenide.

16. The method of claim 10 wherein a substantial portion of the fixed electrode overlying the anchor material is a monocrystalline silicon.

17. The method of claim 10 wherein a substantial portion of the fixed electrode overlying the anchor material is a polycrystalline silicon.

18. A method of manufacturing an electromechanical device having a contact and a mechanical structure which includes fixed and moveable electrodes that reside in a chamber, wherein the electromechanical device includes a substrate, an insulation layer disposed on the substrate, and a first semiconductor layer disposed on the insulation layer and wherein the fixed electrode is affixed to the substrate via an anchor material, the method comprising:

removing portions of the first semiconductor layer and the insulation layer to thereby expose a portion of the substrate and form an anchor opening;

depositing an anchor material in the anchor opening;

depositing a second semiconductor layer over the anchor material and the first semiconductor layer;

etching the first and second semiconductor layer to form the fixed and moveable electrodes from the first and second semiconductor layers wherein the fixed electrode includes at least a portion of the second semiconductor layer that is disposed over the anchor material, and wherein the fixed electrode is affixed to the substrate via the anchor material;

depositing a sacrificial layer over the fixed and moveable electrodes;

depositing a first encapsulation layer over the sacrificial layer;

forming at least one vent in the first encapsulation layer;

releasing the moveable electrode by removing the insulation layer underlying the moveable electrode wherein the anchor material is not substantially removed when releasing moveable electrode;

depositing a second encapsulation layer over or in the vent to seal the vents wherein the second encapsulation layer is a semiconductor material;

forming a trench around at least a portion of the contact wherein the contact and the trench as disposed outside the chamber; and

depositing a first material in the trench to electrically isolate the contact.

19. The method of claim 18 wherein the first encapsulation layer is comprised of polycrystalline silicon, amorphous silicon, silicon carbide, silicon/germanium, germanium or gallium arsenide.

20. The method of claim 18 wherein the first material is silicon dioxide or silicon nitride.

21. The method of claim 18 wherein the second encapsulation layer is comprised of polycrystalline silicon, porous polycrystalline silicon, amorphous silicon, silicon carbide, silicon/germanium, germanium or gallium arsenide.

22. The method of claim 18 wherein the trench surrounds the contact to electrically isolate the contact.

23. The method of claim 18 further including depositing a semiconductor material in the trench after depositing the first material and wherein the first material is disposed on the outer surfaces of the trench.

24. The method of claim 23 further including planarizing an exposed surface of the trench.

25. The method of claim 18 further including:

depositing an insulating layer on at least a portion of the trench;

depositing a highly conductive material on the contact and over the insulating layer to provide electrical connection to the contact.

26. The method of claim 18 wherein the insulation layer is comprised of silicon oxide and the anchor material includes silicon nitride, silicon carbide, germanium, silicon/germanium or gallium arsenide.

27. The method of claim 18 wherein the insulation and sacrificial layers are comprised of silicon oxide and the anchor material includes silicon, silicon carbide, germanium, silicon/germanium or gallium arsenide.

28. The electromechanical device of claim 27 wherein the trench surrounds the contact.

29. The method of claim 18 wherein the insulation layer is comprised of silicon nitride and the anchor material includes silicon, silicon oxide, silicon carbide, germanium, silicon/germanium or gallium arsenide.

30. The method of claim 18 wherein a substantial portion of the fixed electrode overlying the anchor material is a monocrystalline silicon.

31. The method of claim 18 wherein a substantial portion of the fixed electrode overlying the anchor material is a polycrystalline silicon.

32. An electromechanical device comprising:

a substrate

an insulation layer disposed on the substrate,

a first semiconductor layer disposed on the insulation layer;

an anchor that is disposed in an opening in the insulation layer and the first semiconductor layer and contacts the substrate, wherein the anchor includes a material that is different than the insulation layer;

a second semiconductor layer, disposed on the anchor; and

a fixed electrode, formed in part from the second semiconductor layer, wherein the fixed electrode is affixed to the substrate via the anchor.

33. The device of claim 32 wherein the anchor includes silicon nitride, silicon carbide, germanium, silicon/germanium or gallium arsenide.

34. The device of claim 32 wherein the insulation layer includes silicon nitride or silicon oxide.

35. The device of claim 32 further including a moveable electrode, juxtaposed the fixed electrode, wherein the moveable electrode is formed in part from the second semiconductor layer.

36. The device of claim 35 wherein the insulation layer is comprised of silicon oxide and the anchor material includes silicon nitride, silicon carbide, germanium, silicon/germanium or gallium arsenide.

37. The device of claim 35 wherein the insulation layer is comprised of silicon oxide and the anchor material includes silicon, silicon carbide, germanium, silicon/germanium, or gallium arsenide.

38. The device of claim 35 wherein the insulation layer is comprised of silicon nitride and the anchor material includes silicon, silicon oxide, silicon carbide, germanium, silicon/germanium or gallium arsenide.

39. The device of claim 32 wherein a substantial portion of the fixed electrode overlying the anchor material is a monocrystalline silicon.

40. The device of claim 32 wherein a substantial portion of the fixed electrode overlying the anchor material is a polycrystalline silicon.

41. The device of claim 32 further including

a chamber including a first encapsulation layer having at least one vent;

a moveable electrode disposed in the chamber and juxtaposed the fixed electrode;

a second encapsulation layer comprised of a semiconductor material, deposited over or in the vent, to thereby seal the chamber

42. The device of claim 41 wherein the second encapsulation layer is comprised of polycrystalline silicon, porous polycrystalline silicon, amorphous silicon, silicon carbide, silicon/germanium, germanium or gallium arsenide.

43. The device of claim 42 wherein the first encapsulation layer is comprised of polycrystalline silicon, porous polycrystalline silicon, amorphous silicon, germanium, silicon/germanium, gallium arsenide, silicon nitride or silicon carbide.

44. The device of claim 41 wherein:

the first encapsulation layer is a semiconductor material that is doped with a first impurity to provide a first region of a first conductivity type, and

the semiconductor material of the second encapsulation layer is doped with a second impurity to provide a second region with a second conductivity type and wherein the first conductivity type is opposite the second conductivity type.

45. The device of claim 41 further including a contact disposed outside the chamber.

46. The device of claim 41 wherein a first portion of the first encapsulation layer is comprised of a monocrystalline silicon and a second portion is comprised of a polycrystalline silicon.

47. The device of claim 41 wherein a first portion of the first encapsulation layer is comprised of a monocrystalline silicon and a second portion is comprised of a porous or amorphous silicon.

48. The device of claim 47 wherein the second encapsulation layer overlying the second portion of the first encapsulation layer is a polycrystalline silicon.

49. The device of claim 48 includes a field region disposed outside and above the chamber wherein the field region is comprised of a monocrystalline silicon.

50. An electromechanical device comprising:

a substrate

an insulation layer disposed on the substrate,

a first semiconductor layer disposed on the insulation layer;

an anchor that is disposed in an opening in the insulation layer and the first semiconductor layer and contacts the substrate, wherein the anchor includes a material that is different than the insulation layer;

a second semiconductor layer, disposed on the anchor; and

a fixed electrode, formed in part from the second semiconductor layer, wherein the fixed electrode is affixed to the substrate via the anchor

a moveable electrode, formed in part from the second semiconductor layer, wherein the moveable electrode is disposed in a chamber wherein the chamber includes a first encapsulation layer;

a second encapsulation layer comprised of a semiconductor material, deposited over or in the vent, to thereby seal the chamber;

a contact; and

a trench, disposed around at least a portion of the contact wherein the contact and the trench as disposed outside the chamber and wherein the trench includes a first material disposed therein to electrically isolate the contact.

51. The device of claim 50 wherein the second encapsulation layer is comprised of polycrystalline silicon, porous polycrystalline silicon, amorphous silicon, silicon carbide, silicon/germanium, germanium, or gallium arsenide.

52. The device of claim 51 wherein the first encapsulation layer is comprised of polycrystalline silicon, porous polycrystalline silicon, amorphous silicon, germanium, silicon/germanium, gallium arsenide, silicon nitride or silicon carbide.

53. The device of claim 50 wherein the first material is an insulating material is disposed on at least the outer surfaces of the trench.

54. The device of claim 53 wherein the trench includes a second material surrounded by the first material and wherein the second material is a semiconductor material.

55. The device of claim 53 wherein the trench is disposed on an etch stop region.

56. The device of claim 53 wherein the etch stop region is a silicon nitride or silicon dioxide.

57. The device of claim 53 wherein the first material is a silicon nitride or silicon dioxide.

58. The device of claim 53 wherein the trench surrounds the contact.

59. The device of claim 50 wherein the anchor includes silicon nitride, silicon carbide, germanium, silicon/germanium or gallium arsenide.

60. The device of claim 50 wherein the insulation layer includes silicon nitride or silicon oxide.

61. The device of claim 50 wherein the insulation layer is comprised of silicon oxide and the anchor material includes silicon nitride, silicon carbide, germanium, silicon/germanium or gallium arsenide.

62. The device of claim 50 wherein the insulation layer is comprised of silicon nitride and the anchor material includes silicon, silicon oxide, silicon carbide, germanium, silicon/germanium or gallium arsenide.

63. The device of claim 50 wherein a substantial portion of the fixed electrode overlying the anchor material is a monocrystalline silicon.

64. The device of claim 50 wherein a substantial portion of the fixed electrode overlying the anchor material is a polycrystalline silicon.